

We claim:

- 1           1.     A surgical probe, comprising:
  - 2                a shaft defining a distal end and a proximal end;
  - 3                a plurality of energy transmission devices supported on the
  - 4 shaft; and
  - 5                a tissue cooling apparatus supported on the shaft including an
  - 6 outer member positioned about the plurality of energy transmission devices
  - 7 such that a continuous fluid transmission space is defined therebetween
  - 8 having an inlet and an outlet.
- 1           2.     A surgical probe as claimed in claim 1, wherein the shaft
- 2 comprises a relatively short shaft.
- 1           3.     A surgical device as claimed in claim 2, wherein at least a
- 2 portion of the relatively short shaft is malleable.
- 1           4.     A surgical device as claimed in claim 1, wherein the plurality of
- 2 energy transmission devices comprises a plurality of electrodes.
- 1           5.     A surgical probe as claimed in claim 1, wherein the tissue
- 2 cooling apparatus comprises a porous structure.
- 1           6.     A surgical probe as claimed in claim 5, wherein the porous
- 2 structure comprises a microporous structure.
- 1           7.     A surgical probe as claimed in claim 1, wherein the fluid
- 2 transmission space defines a substantially constant cross-sectional area
- 3 between the inlet and the outlet.
- 1           8.     A surgical probe as claimed in claim 8, wherein the fluid
- 2 transmission space defines a substantially annular shape.

1 9. A surgical probe as claimed in claim 1, further comprising:  
2 a fluid supply line associated with the inlet and supported on the  
3 exterior of the shaft.

1 10. A tissue cooling apparatus for use with an electrophysiology  
2 apparatus including a shaft and at least one energy transmission device  
3 supported on the shaft, the tissue cooling apparatus comprising:

4 a base member defining an interior lumen that is slightly larger  
5 than the electrophysiology apparatus shaft and a proximal opening adapted to  
6 receive the electrophysiology apparatus shaft, the base member including a  
7 fluid lumen port in fluid communication with the interior lumen;

8 a tubular member, associated with the base member, defining a  
9 proximal end, a distal end, an interior lumen substantially aligned with the  
10 base member interior lumen and at least one aperture located between the  
11 proximal and distal ends; and

12 an outer member supported on the tubular member such that a  
13 fluid transmission space is defined between the outer member and the tubular  
14 member.

1 11. A tissue cooling apparatus as claimed in claim 10, wherein the  
2 outer member defines a distal end, the tissue cooling apparatus further  
3 comprising:

4 a fluid lumen port associated with at least one of the distal end  
5 of the tubular member and the distal end of the outer member.

1 12. A tissue cooling apparatus as claimed in claim 10, wherein the  
2 base member interior lumen includes a seal adapted to engage the  
3 electrophysiology apparatus shaft.

1 13. A tissue cooling apparatus as claimed in claim 10, wherein the  
2 tubular member comprises a flexible tubular member.

1 14. A tissue cooling apparatus as claimed in claim 10, wherein the  
2 at least one aperture comprises a plurality of apertures.

1 15. A tissue cooling apparatus as claimed in claim 10, wherein the  
2 outer member comprises a porous structure.

1 16. A tissue cooling apparatus as claimed in claim 15, wherein the  
2 porous structure comprises a microporous structure.

1 17. A tissue cooling apparatus as claimed in claim 10, wherein the  
2 outer member defines proximal and distal ends and the proximal and distal  
3 ends of the outer member are secured to the tubular member.

1 18. A tissue cooling apparatus for use with an electrophysiology  
2 apparatus including a shaft and at least one energy transmission device  
3 supported on a distal portion of the shaft, the tissue cooling apparatus  
4 comprising:

5 a base member adapted to be removably mounted on the  
6 electrophysiology apparatus shaft including an inlet port and a seal configured  
7 to mate with the electrophysiology apparatus shaft; and

8 a fluid transfer assembly, operably connected to the base  
9 member, including an outer member in fluid communication with the inlet port  
10 defining a size and shape sufficient to receive the distal portion of the  
11 electrophysiology apparatus shaft in such a manner that a fluid transmission  
12 space is defined between the electrophysiology apparatus shaft and the outer  
13 member and an outlet port.

1 19. A tissue cooling apparatus as claimed in claim 18, wherein the  
2 outer member comprises a porous structure.

1 20. A tissue cooling apparatus as claimed in claim 19, wherein the  
2 porous structure comprises a microporous structure.

1 21. A tissue cooling apparatus as claimed in claim 18, wherein the  
2 fluid transfer assembly includes a tubular member including a plurality of  
3 apertures, the plurality of apertures being located within the outer member.

1 22. A tissue cooling apparatus as claimed in claim 18, wherein the  
2 tubular member is secured to the base member and the outer member is  
3 supported on the tubular member.

1 23. A tissue cooling apparatus for use with an electrophysiology  
2 apparatus including a shaft and at least one energy transmission device  
3 supported on a distal portion of the shaft, the tissue cooling apparatus  
4 comprising:

5 a fluid transfer assembly defining an inlet, an outlet, and a size  
6 and shape sufficient to receive the distal portion of the electrophysiology  
7 apparatus shaft in such a manner that a fluid transmission space is defined  
8 between the electrophysiology apparatus shaft and the outer member; and

9 mounting means for removably mounting the fluid transfer  
10 assembly onto the electrophysiology apparatus shaft.

1 24. A tissue cooling apparatus as claimed in claim 23, further  
2 comprising:

3 sealing means for forming a seal between the mounting means  
4 and the electrophysiology apparatus shaft.

1 25. <sup>at</sup> A tissue cooling apparatus as claimed in claim 18, wherein the  
2 fluid transfer assembly comprises a porous structure.

1 26. A tissue cooling apparatus as claimed in claim 19, wherein the  
2 porous structure comprises a microporous structure.

1 27. A tissue cooling apparatus as claimed in claim 23, further  
2 comprising:

- 3                    sealing means for forming a seal between the mounting means  
4                    and the electrophysiology apparatus shaft.

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